Advantage Silver Series by Ebtron

Installation, Operation and Maintenance Technical Manual

STx102

"Plug & Play" Transmitters

Includes Analog output models: STA102-P, STA102-B & STA102-T

Document Name: TM_STx102_R3C

SILVER SERIES
TECHNICAL MANUAL

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TM_STx102_R3C

Part Number: 930-0065

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LIST OF EFFECTIVE AND CHANGED PAGES

Insert latest changed pages (in bold text); remove and dispose of superseded pages.
Total number of pages in this manual is **16.**

Page No	Revision *	Description of Change	Date
1, 2	**R3C**	**Updated title page and List of Effective Pages revision to R3C**	**08/27/2013**
6	**R3C**	**Corrected dimensions for case height**	**08/27/2013**
4	R3B	Corrected resolution to 0.025%	12/02/2010
1	R3A	Change revision to R3A	01/19/2010
2	R3A	Updated this page; change revision to R3A	01/19/2010
3	R3A	Updated Table of Contents, List of Figures	01/19/2010
Appendix A	R3A	Added Analog Wiring Diagram	01/19/2010
1	R2A	Change revision to R2A	12/10/2009
2	R2A	Updated this page; change revision to R2A	12/10/2009
14	R2A	Modified Troubleshooting Guide for addition of Diagnostic LED Fault Trouble codes	12/10/2009
1	R1E	Change revision to R1E	8/24/2009
2	R1E	Updated this page; change revision to R1E	8/24/2009
7, 9	R1E	Revised fuse part numbers	8/24/2009
9	R1D	Power fuse 0.5A part number corrected to 240-1226	8/18/2009
1	R1C	Added Document Part Number; change revision to R1C	3/2/2009
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1, 2	R1B	Update document cover and this page from R1A to R1B	2/18/2009
3, 4	R1B	Republished as revision R1B	2/18/2009
5	R1B	Added status LED and legend	2/18/2009
6 to 8	R1B	Republished as revision R1B	2/18/2009
9	R1B	Added status LED and legend	2/18/2009
10	R1B	Added K factor reference data to Table 3	2/18/2009
11 to 13	R1B	Republished as revision R1B	2/18/2009
14, 15	R1B	Revised troubleshooting tables for status LED nomenclature	2/18/2009
16	R1B	Republished as revision R1B	2/18/2009
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OVERVIEW

EBTRON's economical STx102 transmitter (Figure 1) can process up to 2 individual sensing points and is compatible with a number of *EBTRON* sensor systems. The transmitter requires 24 VAC and provides the host controls with an output signal for airflow. Each transmitter is fully independent of the sensor probes and does not require field matching to them. Table 1 details the specifications of the STx102 transmitter.

The STx102 transmitter is ideal for measurement in ducts (using -P or -T probes) or with single "bleed" airflow sensors (using -B sensor probes). Field configuration is accomplished by setting DIP switches on the main circuit board. An output signal digital **GAIN** control permits one or two point field adjustment to factory calibration for installations that require field calibration or adjustment.

The STx102 transmitter is available in an analog version only, with selectable 0-10VDC or 4-20mA output as shown in the Ordering Guide, Figure 2, and in an the connectivity chart of Table 2.

Figure 1. STx102 Transmitter

SPECIFICATIONS

Table 1. STx102 Specifications

Maximum Number of Sensing Points
- 2 (2 airflow + 2 temperature, independently processed)

Sensor System Configurations (max.)
- Type A (probes x sensors/probe): 1x2 (SP1 and ST1probes), 1X1 (SB1 Bleed Sensors)

Digital Signal Processing
- Microprocessor: Yes
- Multiplexing: 4 individual channels
- A/D Converter: 12-Bit

"Plug and Play" Sensor Systems
- Probes do not require matching to transmitter

Power Requirements
- Voltage: 24 VAC (22.8 to 26.4 VAC), isolation not required
- "Brownout" protection: "Watchdog" reset circuit
- Power: 8 VA max.
- Protection: Over voltage, over current and surge protection

Enclosure
- Aluminum

User Interface
- DIP switches

Display
- Not available

Output to Host Controls
- Output/Protocols Supported:
  a.) STA102: Isolated 0-10VDC or 4-20mA (resolution 0.025% F.S.)
- Airflow Output Adjustments: Digital **GAIN** potentiometer (must be enabled)

System Diagnostics
- Sensor/transmitter diagnostic mode with LED flash notification

Environmental Limits
- Operating Temperature: -20° F to 120° F (-28.8° C to 48.8° C)
- Moisture: 0 to 99% rh, non condensing (protect from water)

Compatible Sensor Systems
- SP1 probes, ST1 small duct probes, and SB1 "bleed" sensors

Listings
- UL® 873 Airflow & Temperature Indicating Devices

Warranty
- 36 months from shipment

ADVANCED TECHNOLOGY

- Microprocessor-based electronics with industrial grade integrated circuits.
- "Plug and Play" design sensor probe design.
- Accepts up to 2 individual airflow and temperature sensor pairs.
- DIP Switch user interface for simple field configuration
- Airflow output.
- Analog output selectable 0-10VDC or 4-20mA

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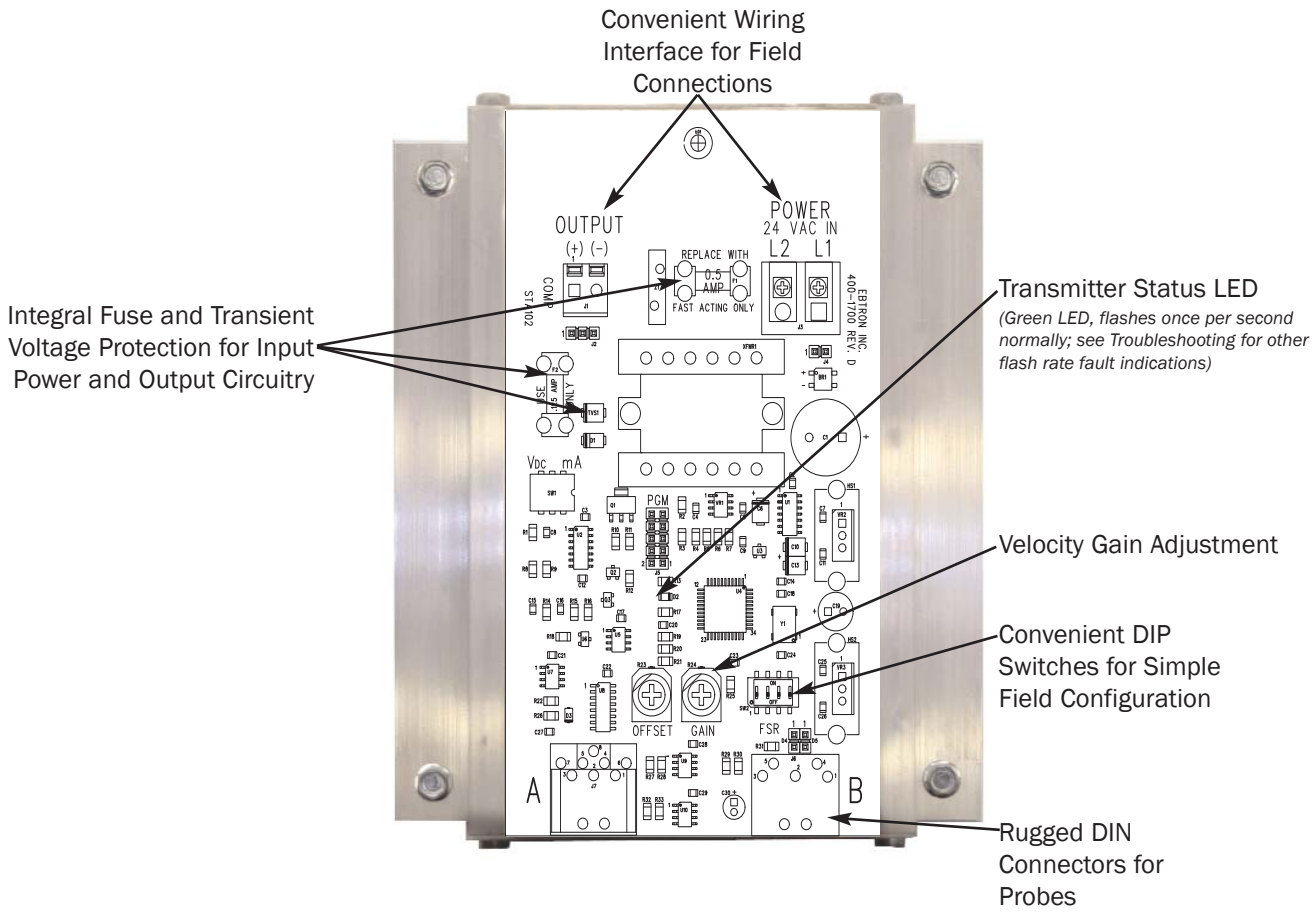

Figure 2. STx102 Transmitter Features

ORDERING GUIDE FOR STx102 TRANSMITTER

S T A 1 0 2

Note: The STx102 is available in analog version only. Other versions of the STx102 transmitter are not available at this time.

Figure 3. STx102 Transmitter Ordering Guide

Table 2. STx102 Connectivity Options

Output to Host Controls	Output/Protocols Supported	Airflow	Temperature	Status
Analog x=A	Linear 0-10VDC or 4-20mA	Yes	No	Visual Only

STx102 TRANSMITTER INSTALLATION

The STx102 transmitter is designed for use in an environment between -20° F to 120° F *(-28.9° C to 48.9° C)* where it will not be exposed to rain or snow.

Mount the transmitter upright in a field accessible location. The enclosure (Figure 4) is designed to accept 3/4 inch *(19.0 mm)* conduit fittings for signal and power wiring at the top left and right sides of the circuit board. Locate the transmitter so that the connecting cables from the sensor probes will reach the receptacles on the bottom of the transmitter enclosure.

In locations exposed to direct rain and/or snow, the transmitter must be enclosed in a NEMA4 enclosure.

Leave at least 6.5 inches *(165.1 mm)* above, and 3 inches *(76.2 mm)* to each side and bottom, of unobstructed space around the transmitter to allow for heat dissipation and cover removal.

Locate the transmitter in a location that can be reached by all connecting cables from the sensor probes.

Do not drill into the transmitter enclosure since metal shavings could damage the electronics.

Mechanical Dimensions

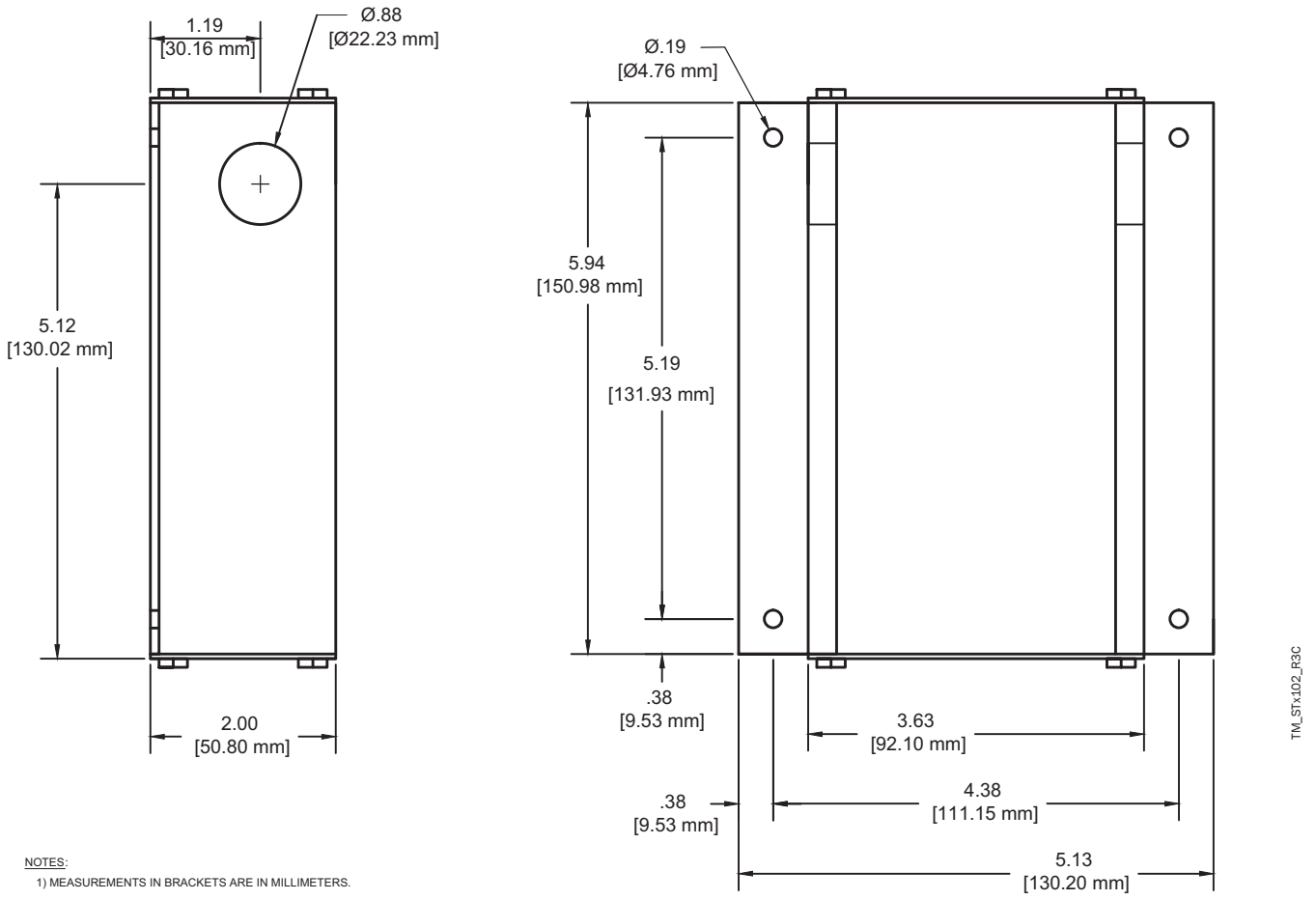

Figure 4. STx102 Transmitter Mechanical Detail Drawing

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Power Transformer Selection

The 24 VAC transformer selected must be capable of supplying 8 VA. The operating supply voltage (transmitter power "ON" with all sensor probes connected) should not be less than 22.8 VAC or greater than 26.4 VAC.

Connecting Power to the Transmitter

Slide the cover plate up and off of the transmitter enclosure, and ensure that the power source is deactivated before connecting 24 VAC to the transmitter.

Connect 24 VAC power to the large, two position power input terminals labeled "POWER - L2/L1" on the upper right hand side of the main circuit board as shown in Figure 5 and in the wiring diagram of Appendix A. It is not necessary to provide an isolated power source (secondary not grounded) since the output signals are galvanically isolated from the power supply.

Multiple STx102 transmitters wired to a single transformer must be wired "in-phase" (L1 to L1, L2 to L2).

Sensor probes must be connected to the transmitter before applying power in order to properly "flash" sensor calibration data to the transmitter.

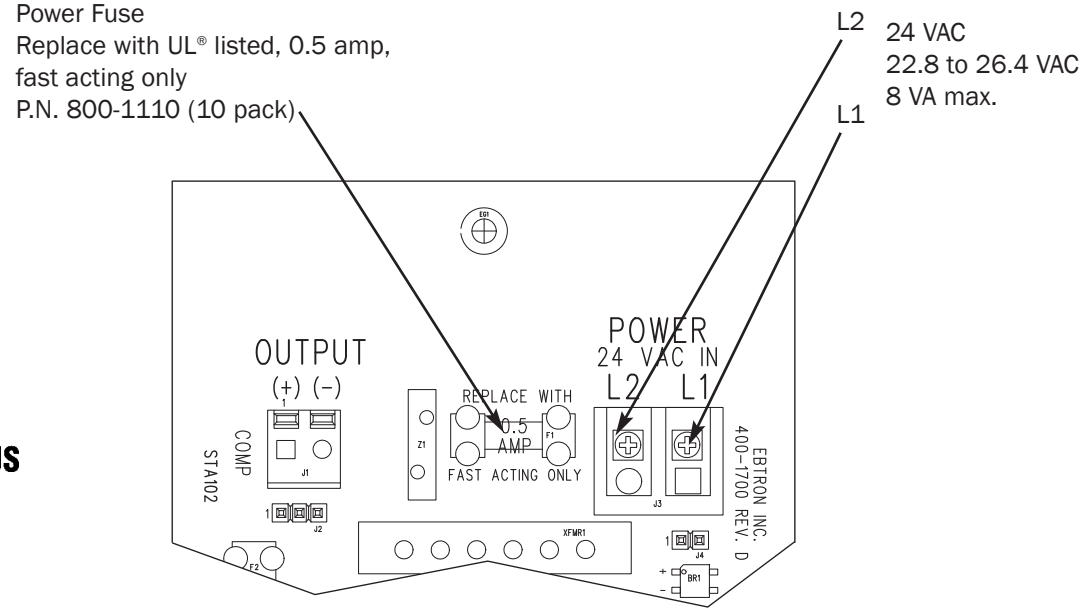

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Figure 5. STx102 Power Connections

Connecting Sensor Probes to the Transmitter

After mounting the sensor probes and transmitter, connect the sensor probe cable plug to the circular receptacle located at the bottom of the STx102 transmitter enclosure. STx102 transmitters accept SP1, ST1 , or SB1 sensors. Figures 6 and 7 show transmitter and sensor probe connector details.

Provide a "drip loop" at the transmitter if there will be the potential for water runoff or condensation along the sensor probe cable(s).

Sensor probe cable plugs are "keyed" as shown in the detail below. Line up plug with receptacle and push straight on to receptacle. DO NOT TWIST. Forcing the cable plug in the receptacle may damage the connectors and void the warranty.

TRANSMITTER

Accepts 1 probe up to 2 sensors.

CONNECTING CABLE PROBES TO TRANSMITTER

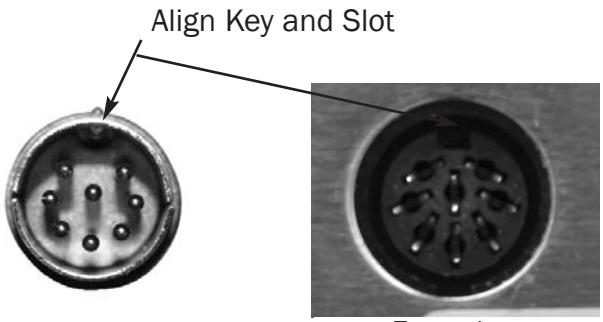
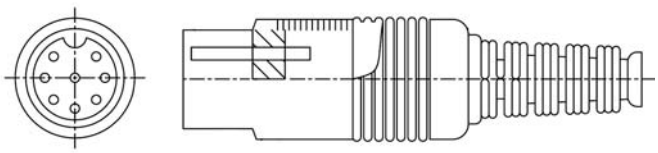


Figure 6. Transmitter Connector Detail



Pull to Remove
DO NOT TWIST!

Figure 7. Probe Connector Detail

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STA102 Analog Transmitter Set Up

The STA102 analog transmitter provides a single 10-bit (1024 discrete states) linear analog output with overvoltage and overcurrent protection. The output is field selectable as either 0-10VDC or 4-20mA, and is galvanically isolated from the main power supply to permit simple integration to virtually all building automation systems.

To wire the output signal, slide the cover plate up and off of the enclosure. Ensure that the 24 VAC power source is deactivated. Connect signal wires for airflow rate at the two position output terminal labeled "OUTPUT" on the upper left hand side of the main circuit board as indicated in Figure 8 and as shown in the wiring diagram of Appendix A.

When configured for a 4-20mA output, the STA102 is a "4-wire" device. The host controls must not provide any excitation voltage to the output of the STA102.

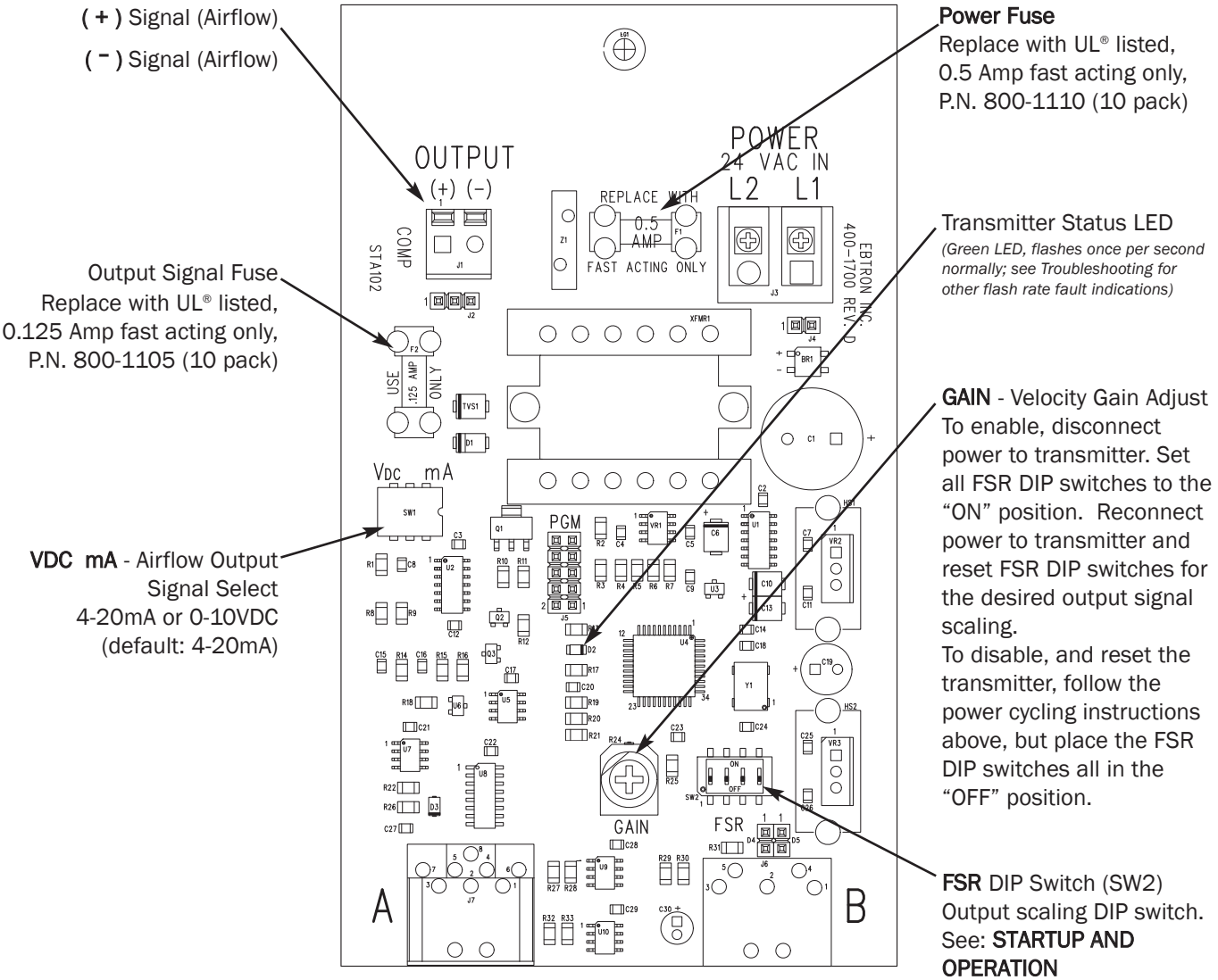

Figure 8. STA102 Analog Circuit Board Detail

Analog Output Signal 0-10VDC / 4-20mA Selection

The transmitter is shipped from the factory with the analog output signal selector set to the 4-20mA output position. If the 0-10VDC output is desired, simply move the output selector switch (**VDC/ MA**) to the **VDC** position as shown in Figure 8.

Converting Analog Output Signals to Airflow

Since the accuracy of the STA102 is "percent of reading" there should be no need to reconfigure the default output scales listed inside of the transmitter cover. However, if desired, factory default settings can be easily reconfigured in the field as described in the STARTUP AND OPERATION SECTION of this manual.

The equivalent volumetric flow full scale reading can easily be determined by multiplying the full scale reading by the free area of the duct (sq ft) where the airflow sensor probe is located (for S.I. measurement units, multiply free area of duct in square meters x 1000). For -P and -T sensor probes, the free area is printed on its hang-tag. For -B sensor probes, the free area should be determined after they are installed. Table 3 lists specific conversion factors for analog voltage or current options for each sensor type.

Table 3. STA102 Converting Analog Output to Airflow

Converting 0-10VDC to:	Converting 4-20mA to:
Unidirectional Airflow (-P and -T sensors) Airflow (fpm, m/s) = Output Voltage/10 x FS1 Airflow (cfm) = Area (square feet) x Output Voltage/10 x FS1 Airflow (l/s) = Area (square meters) x 1000 x Output Voltage/10 x FS1	Unidirectional Airflow (-P and -T sensors) Airflow (fpm, m/s) = (Output Current* - 4)/16 x FS1 Airflow (cfm) = Area (square feet.) x (Output Current - 4)/16 x FS1 Airflow (l/s) = Area (square meters) x 1000 x (Output Current - 4)/16 x FS1
Unidirectional Airflow (-B sensors) Airflow (fpm, m/s) = Output Voltage/10 x FS1 Airflow (cfm, l/s) = K x Output Voltage/10 x FS1 *where K is determined by field measurement or from K tables*[1]	Unidirectional Airflow (-B sensors) Airflow (fpm, m/s) = (Output Current* - 4)/16 x FS1 Airflow (cfm, l/s) = K x (Output Current* - 4)/16 x FS1 *where K is determined by field measurement or from K tables*[1]
Unidirectional Differential Pressure (-B sensors only) Airflow (inWg, Pa) = Output Voltage/10 x FS1	Unidirectional Differential Pressure (-B sensors only) Airflow (inWg, Pa) = (Output Current* - 4)/16 x FS1
Bidirectional Airflow (-B sensors only) Airflow (fpm) = (Output Voltage - 5)/5 x FS1 Airflow (cfm, l/s) = K x (Output Voltage - 5)/5 x FS1 *where K is determined by field measurement or from K tables*[1]	Bidirectional Airflow (-B sensors only) Airflow (fpm) = (Output Current* - 12)/8 x FS1 Airflow (cfm, l/s) = K x (Output Current* - 12)/8 x FS1 *where K is determined by field measurement or from K tables*[1]
Bidirectional Differential Pressure (-B sensors only) Airflow (inWg) = (Output Voltage - 5)/5 x FS1	Bidirectional Differential Pressure (-B sensors only) Airflow (inWg) = (Output Current - 12)/8 x FS1 ** Output Current is in mA* *[1] Refer to K factor tables in separate Bleed Sensor Technical Manual, TM_HB1/SB1.*

Sending a Test Output Signal to the Host Control System

Test output signals of 0 and 50% of the full scale output (0 to 10VDC or 4 to 20mA) can be provided by the STA102 transmitter to verify proper conversion of the output signals from the STA102 transmitter at the host control system.

To set a fixed "zero scale" output signal for airflow (which is 4mA for 4-20mA, and 0VDC for 0-10VDC), set all the FSR DIP switches to the "OFF" position during operation.

To set a fixed half-scale output signal for airflow (which is 12mA for 4-20mA, and 5VDC for 0-10VDC), set all the FSR DIP switches to the "ON" position during operation.

STx102 TRANSMITTER START UP AND OPERATION

To ensure proper operation, verify that sensor probes are installed in accordance with ***EBTRON*** placement guidelines.

Before applying power to the transmitter, verify that the physical installation, the power connections and signal wiring have been accomplished in accordance with this manual, and that the sensor probes are installed in accordance with *EBTRON* Placement Guidelines as indicated in the separate sensor probe technical manual.

Apply power to the transmitter. At each turn-on, the transmitter executes a complete self-check that takes approximately 10 seconds to complete. Check that the readings at the host control system return an output that matches the output of the STx102.

The STA102 analog transmitter version is designed to operate normally on "POWER-UP". The default output signal type is set to 4-20mA. No further field configuration is necessary unless 0-10VDC output signals are required. Refer to the **STA102 Analog Transmitter Set Up** section of this manual for further information, or contact ***EBTRON*** Customer Service, toll free, at 800-232-8766.

Transmitter Initialization and Reset

The STx102 transmitter automatically initializes at power-up and conducts full system diagnostics. Under normal conditions, there is no reason to re-initialize the transmitter. However, if there is a need to re-initialize the transmitter, perform the following procedure:

1. Note the positions of all of the FSR DIP switches, and then set them all to the "OFF" position.

2. Momentarily deactivate power to the transmitter, or momentarily remove power connection at L1 or L2 of the POWER terminals (see Figure 8.). This will reset the transmitter.

3. Return the DIP switches to the positions noted in step 1 when complete.

The transmitter will clear and re-read the sensor data, and will also disable the velocity **GAIN** adjustment potentiometer on the STA102 if it had been enabled. Refer to Figure 8 to re-enable the velocity **GAIN** setting if desired.

TRANSMITTER CALIBRATION

The STx102 uses high quality industrial grade components and is designed for years of trouble-free operation. Periodic recalibration of the transmitter is neither required or recommended. For installations requiring periodic validation of instrumentation, Transmitter Field Calibration Verifiers are available from ***EBTRON***. Contact ***EBTRON*** for more details.

CHANGING FACTORY DEFAULT SETTINGS

The STx102 transmitter is factory tested, set up and ready for operation with type SP1, ST1 and SB1 sensor probes without any user intervention. When power is applied, the transmitter automatically determines the type of sensors connected and defaults to predetermined factory settings. Factory settings can easily be changed during normal operation in the field by setting the FSR DIP switches on the main circuit board as indicated in Table 4. Power does not have to be cycled for new settings to take effect.

Converting the Output Signal from fpm to cfm (meters/s to liters/s for S.I. scaling)

The equivalent volumetric flow (cfm or l/s) can easily be determined by multiplying the output velocity (fpm or m/s) by the free area in square feet where the sensor probe is located (or free area in square meters x 1000 for m/s output). The total free area is printed on the hang-tag of -P sensor probes for each size ordered. The free area on -T and -B probes should be determined after they are installed.

Table 4. DIP Switch Settings for Analog output Scaling (with Default Values)

SW2				STA102-P	STA102-T	STA102-B
DIP Switch Position				Output 1	Output 1	Output 1
1	2	3	4			
off	off	off	off	Output = null	Output = null	Output = null
off	off	off	on	0-500 FPM	0-500 FPM	+/- 0.05 in.w.g.
				(0-2.54 m/s)	*(0-2.54 m/s)*	*(+/- 12.45 Pa)*
off	off	on	off	0-500 FPM	0-500 FPM	+/- 0.15 in.w.g.
				(0-2.54 m/s)	*(0-2.54 m/s)*	*(+/- 37.5 Pa)*
off	off	on	on	0-1,000 FPM	0-1,000 FPM	+/- 0.25 in.w.g.
				(0-5.08 m/s)	*(0-5.08 m/s)*	*(+/- 62.25 Pa)*
off	on	off	off	0-1,000 FPM	0-1,000 FPM	*+/- 0.50 in.w.g.*
				(0-5.08 m/s)	*(0-5.08 m/s)*	*(+/- 124.5 Pa)*
off	on	off	on	0-1,500 FPM	0-1,500 FPM	0-250 FPM
				(0-7.62 m/s)	*(0-7.62 m/s)*	*(0-1.27 m/s)*
off	on	on	off	0-1,500 FPM	0-1,500 FPM	0-500 FPM
				(0-7.62 m/s)	*(0-7.62 m/s)*	*(0-2.54 m/s)*
off	on	on	on	0-2,000 FPM	0-2,000 FPM	0-1,000 FPM
				(0-10.16 m/s)	*(0-10.16 m/s)*	*(0-5.08 m/s)*
on	off	off	off	0-2,000 FPM	0-2,000 FPM	0-2,000 FPM
				(0-10.16 m/s)	*(0-10.16 m/s)*	*(0-10.16 m/s)*
on	off	off	on	0-2,500 FPM	0-2,500 FPM	0-3,000 FPM
				(0-12.7 m/s)	*(0-12.7 m/s)*	*(0-15.24 m/s)*
on	off	on	off	0-2,500 FPM	0-2,500 FPM	+/- 250 FPM
				(0-12.7 m/s)	*(0-12.7 m/s)*	*(+/- 1.27 m/s)*
on	off	on	on	0-3,000 FPM	0-3,000 FPM	+/- 500 FPM
				(0-15.24 m/s)	*(0-15.24 m/s)*	*(+/- 2.54 m/s)*
on	on	off	off	0-3,000 FPM	0-3,000 FPM	+/- 1,000 FPM
				(0-15.24 m/s)	*(0-15.24 m/s)*	*(0-5.08 m/s)*
on	on	off	on	0-5,000 FPM	0-5,000 FPM	+/- 2,000 FPM
				(0-25.4 m/s)	*(0-25.4 m/s)*	*(+/- 10.16 m/s)*
on	***on***	***on***	***off***	**0-5,000 FPM**	**0-5,000 FPM**	**+/- 3,000 FPM**
				(0-25.4 m/s)	***(0-25.4 m/s)***	***(+/- 15.24 m/s)***
on	on	on	on	Output = 1/2 F.S.	Output = 1/2 F.S.	Output = 1/2 F.S.

Underlined items indicate Factory Default Values

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FIELD ADJUSTMENT OF FACTORY CALIBRATION

The factory calibration should not require adjustment if the sensor probes are installed in accordance with published installation guidelines. However, some installations may not meet placement guidelines or commissioning requirements may dictate field adjustment. To adjust the output signal gain, the digital **GAIN** potentiometer (shown in Figure 8) must be enabled. If not enabled, changing the position of "GAIN" will not affect the output of the transmitter. Make sure that the reference device and technique used to determine the airflow rate in the field are suitable for such measurement. Select a location that is acceptable for the device being used as the reference, recognizing that this may not be the location where the ***EBTRON*** airflow station is installed. Typically, field measurement accuracy will not be better than ±5% of reading and can often exceed ±10%. Therefore, ***EBTRON*** recommends that users do not adjust the output of the STx102 if the difference between the transmitter and the field measurement is less than 10%.

Procedure for 1 Point Field Adjustment

Select an airflow rate that represents a valid operating condition for the system. Set fan speed, dampers and VAV boxes to a fixed speed or position when measurements are taken. Complete the following worksheet to determine the gain setting for the host control system.

Determination of a software Gain factor for the host control systems

1. _____ Record the transmitter output as indicated by the host control system. Time averaging the data will improve field recalibration.
2. _____ Record the reference reading. Make sure that the unit of measure (FPM, CFM, MPS or LPS) is identical for both the transmitter and the reference. If the unit of measure is velocity (FPM or MPS), make sure that the reference airflow measurement was corrected for the area where the measurement was taken.
3. _____ Calculate the gain factor (m): **m=line 2/line 1.**
4. Scale the airflow reading in the host control system by 'm', calculated in Step 3. Field adjustment is complete.

Visual Setting of Gain factor potentiometer, "GAIN", on STA102 Analog Output Transmitters.

1. Velocity Gain must first be enabled for settings on potentiometer "GAIN" to take effect. Disconnect power and set all FSR DIP switches to the 'ON' position. Reconnect power, and return the FSR DIP switches for the output signal scaling desired.
2. Make sure that the unit of measure (FPM, CFM, MPS or LPS) is identical for both the transmitter and the reference. If the unit of measure is velocity (FPM or MPS), make sure that the reference airflow measurement was corrected for the area where the measurement was taken. Turn potentiometer "GAIN" until the output of the transmitter is equal to that of the reference. Field adjustment is complete.

MAINTENANCE

When the transmitter and probe are installed in accordance with ***EBTRON*** guidelines, instrument difficulties are rare. Common issues can be easily resolved by viewing the troubleshooting guides of Tables 5 and 6. All devices come with a 3--Year Warranty on Parts and Factory Labor, as well as lifetime, toll-free customer support. Customer support is available Monday through Friday from 8:00 AM to 4:30 PM ET, at 800-2*EBTRON* (232.8766). EBTRON Diagnostic Customer Service forms are available on-line at www.ebtron.com. These forms will assist us in quickly and accurately diagnosing your specific issue and expediting its resolution. In addition a sketch of the installation location, and the control sequence of operations is recommended to expedite resolution of any issue you may encounter. Fax the completed information to 843.756.1838 before you call, and have it available when speaking with our Customer Service representative. Address all correspondence to the EBTRON Customer Service Department. Additional information is available from your local EBTRON representative.

TROUBLESHOOTING GUIDES

General Troubleshooting (All STx102 Systems) Using the Status LED Fault Codes

STA102 - Analog Transmitter Troubleshooting

The transmitter is equipped with a green Status LED indicator and fault detection circuitry to assist in isolating and correcting faults. In order to view the Status LED (D2, located on the main circuit board), remove the transmitter cover by sliding it off the enclosure. Fault trouble codes continuously repeat, beginning with the LED off for 5 seconds, and then flashing a number of times at ½ second intervals. The number of flashes indicates the detected fault condition as shown below. The Action Required column provides the most likely solution to correct the indicated fault condition. If the condition persists, or for further assistance, contact the ***EBTRON*** customer service team at **1-800 2 EBTRON** (***1-800 232-8766***) or visit ***www.ebtron.com***.

Table 5. General Troubleshooting (All STx102 Systems)

Problem	Possible Cause	Remedy
Status LED is not illuminated	Improper supply voltage at the power input terminal block.	Ensure that input voltage is between 22.8 and 26.4 VAC and that it is connected to L1 and L2 of the POWER terminal block.
	Blown fuse.	Check power wiring. Ensure that multiple devices wired on a single transformer are wired "in-phase" (L1 to L1, L2 to L2). Replace fuse with a 0.5 Amp, fast-acting fuse only after the cause of problem has been determined and corrected.
Status LED is illuminated, but is not flashing	The microprocessor is not running.	Deactivate and then reapply power to the transmitter.
Status LED flashing at 1 second intervals	Normal operation. No faults detected.	No action required.
One flash (then 5 second pause)	No sensors have been detected.	Verify that sensor cable is properly connected to the transmitter, and that it has not been cut or damaged. Remove and then re-apply 24V power to the transmitter.
Two flashes (then 5 second pause)	Sensor Trouble (values out of range). The fault detection system has detected a malfunctioning or missing sensor.	Verify that sensor cable is undamaged, properly connected to the transmitter and matches that the information indicated on the probe's hang tag matches the installation.
	Sensors may have been plugged into different connectors after initialization of the transmitter.	Force the transmitter to clear and re-read the sensor data as follows: Record the positions of all DIP switches. Set all FSR DIP switches to the "OFF" position. Cycle 24VAC power to the transmitter OFF and then ON. Return FSR DIP switches to their previous positions. This action will disable the GAIN adjustment potentiometer on the STA102. If necessary, re-enable this feature as shown in Figure 8 and Table 6.
Three flashes (then 5 second pause)	Too many sensors detected. A probe with more than 2 sensors has been connected to the transmitter.	Verify probe and transmitter application. The STx102 can accept a single probe with no more than 2 sensors. Verify that the proper probe has been connected to the transmitter.
Four flashes (then 5 second pause)	Sensor probe type mismatch detected.	The STx102 is designed for operation only with specified sensor probes SP1, ST1 or SB1. Operation with other sensor types is not permitted.
The transmitter indicates airflow when the HVAC system is not operating.	Transient air flow is being detected.	Sensors are sensitive and can measure very low air velocities. If a reading is indicated, there is actual airflow present at the airflow measuring station location. This may be caused by transient wind or induced flow due to pressure differential between duct openings. Do not attempt to adjust the "gain" as this will result in airflow measurement error.

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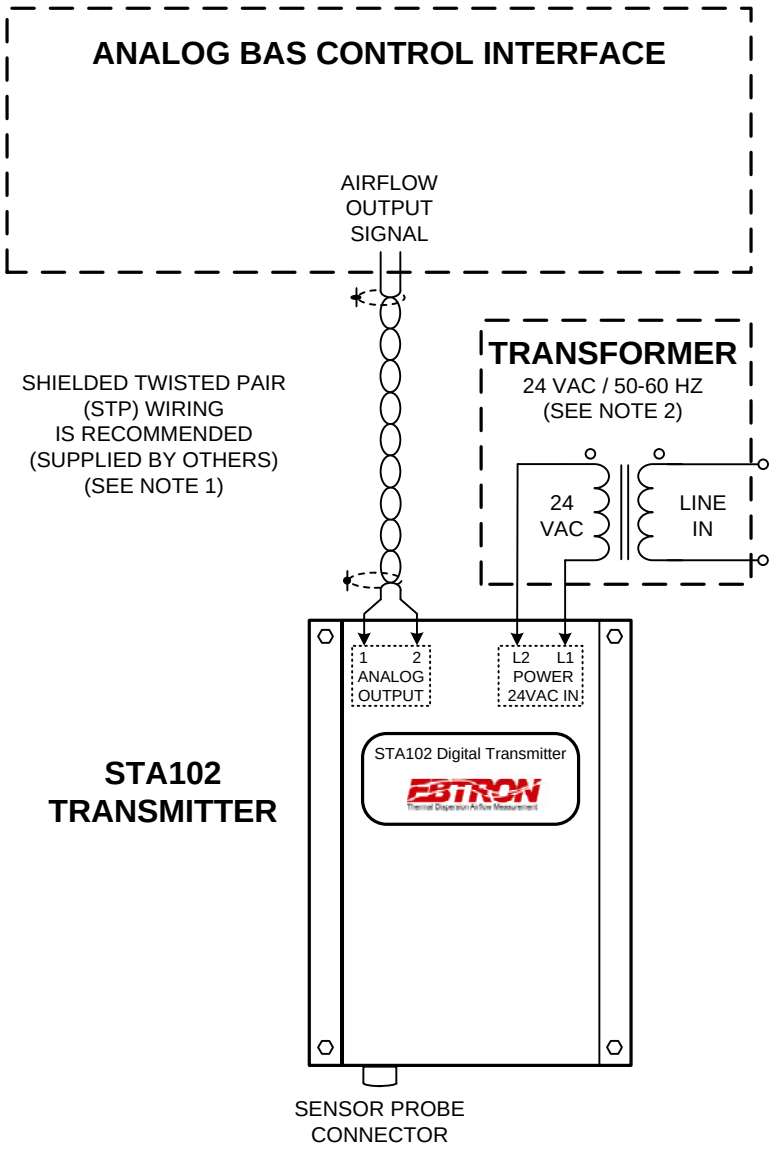
Table 6. STA102 Analog Transmitter Troubleshooting

Problem	Possible Cause	Remedy
Output signal is not available at the OUTPUT terminal block of the STA102 transmitter.	Blown output signal fuse (output is fused and protected on STA102 transmitters).	Ensure that power has not been inadvertently connected to the output terminal block. Replace fuse with 0.125 Amp, fast acting fuse only.
		Confirm that the host control system is not configured for a 2-wire device (no excitation voltage should be present on the signals from the host controls). Correct the problem and replace fuse only with 0.125 Amp, fast acting fuse.
	Sensor data was not completely read during initial startup.	Force the transmitter to clear and re-read the sensor data as follows: Record the positions of all FSR DIP switches. Set all FSR DIP switches to the "OFF" position. Cycle 24VAC power to the transmitter OFF and then ON. Return FSR DIP switches to their previous positions. This action will disable the GAIN adjustment potentiometer on the STA102. If necessary, re-enable this feature as shown below for GAIN potentiometer problem.
The 4-20mA output signal from the STA102 transmitter is less than 4mA.	The VDC / mA selector SW1 position was changed after power-up.	Deactivate power to the STA102 transmitter. Set the VDC / mA selector SW1 to the mA position. Reapply power to transmitter.
The 0-10VDC output signal from the STA102 transmitter is less than 2VDC.	The VDC / mA selector SW1 position was changed after power-up.	Deactivate power to the STA102 transmitter. Set the VDC / mA selector SW1 to the VDC position. Reapply power to transmitter.
The output signal on the STA102 transmitter rapidly fluctuates.	Electrical interference from other devices is inducing noise on the signal wires to the host control system.	Verify that the output signal wiring to the host control system is shielded. Sources of electrical interference vary by location and can usually be resolved by proper grounding techniques. Try individually grounding the following points in the order shown. If that does not resolve the problem begin trying combinations of them. 1. Signal wire shield ground at host control 2. Signal wire shield at the OUTPUT '-' (minus) terminal on the STA102 (ONLY if the host control system allows it) 3. Terminal L2 of the POWER terminal block of the STA102 (ONLY if the host control system allows it).
The GAIN potentiometer does not change the output signal.	The GAIN potentiometer is not enabled.	To enable the GAIN potentiometer, remove power from the STA102 transmitter. Move all of the FSR DIP switches to the "ON" position. Reapply power and wait for the green LED to begin flashing. Return the DIP switches to their previous positions. The output signal can now be adjusted with the GAIN potentiometer. To disable the GAIN potentiometer, repeat the steps above, but with the DIP switches in the "OFF" position.
The output signal does not properly relate to the reading in the host control system.	The scaling in the host control system is incorrect.	Compare the current configuration of the STA102 transmitter with that of the host control system. The minimum and full scale STA102 output settings are determined by DIP switch settings. Refer to the chart on the inside of the transmitter cover).

STANDARD LIMITED PARTS WARRANTY

If any ***EBTRON*** product fails within 36 months from shipment, ***EBTRON*** will repair/replace the device free of charge as described in the company's warranty contained in ***EBTRON***'s *TERMS AND CONDITIONS OF SALE*. Defective equipment shall be shipped back to ***EBTRON***, freight pre-paid, for analysis.

APPENDIX A -
STA102 WIRING DIAGRAM



NOTES:
1: CONNECT OUTPUT SIGNAL CABLE DRAINS TO EARTH GROUND AT ONE END OF CABLE ONLY.

2. ON MULTIPLE STA102 TRANSMITTER INSTALLATIONS WITH A COMMON 24VAC SOURCE, ENSURE THAT 24 VAC POWER TO ALL TRANSMITTERS IS WIRED IN-PHASE TO THE SAME TERMINALS (e.g.: L1 to L1, L2 to L2).

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